Laparoscopic Inguinal Herniorrhaphy: The New Gold Standard of Hernia Repair?

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The surgical treatment of the common inguinal hernia has been one of the most analyzed and debated topics in medicine. Recently, with the success of laparoscopic cholecystectomy, interest in minimally invasive surgical techniques has led to it's application for inguinal hernia repair. Current laparoscopic herniorrhaphies are based on the principles of conventional open preperitoneal repairs and are classified into two types: 1) transabdominal preperitoneal repair (TAPP) and 2) totally extraperitoneal repair (TEP). Common advantages to both techniques include a decrease in postoperative pain,[1] earlier return to normal activity,[2] and improved cosmesis. Both laparoscopic techniques have the disadvantage of requiring general or regional anesthesia and increased procedural costs.[2] Lastly, there is a concern that laparoscopic hernia repair has not been around long enough to know the risk of late recurrences. Laparoscopic herniorrhaphy, however, is a viable alternative to standard open inguinal hernia repair.

Introduction

Surgical treatment of the common inguinal hernia has been one of the most analyzed and debated topics in medicine. Since the earliest inguinal hernia repair described by Celsus in 50 AD to the inception of the "modern" surgical treatment of inguinal hernias in the 19th century, hundreds of different repair techniques have been described and nearly 20 different repairs are currently in use. Furthermore, it is one of the most commonly performed surgical procedures with over half a million patients a year undergoing inguinal herniorrhaphy in the United States alone. Yet despite the long and storied history of inguinal herniorrhaphy and the abundance of clinical data, no single operation has emerged as the operation of choice. In fact, no operation in general surgery has undergone more modifications or is performed in more varying techniques than the routine inguinal repair. Until recently, however, whichever technique was used, the only way to repair an inguinal hernia, was through a relatively large incision on the abdomen. This has the major disadvantages of significant postoperative pain and prolonged disability not only due to the incision itself, but also due to the necessity of having to mobilize the cord structures and nerves in order to repair the inguinal floor. This is especially true for bilateral hernias which require incisions and dissection in both groins or recurrent hernias which require operating through the previous scar.

Recently, with the success of laparoscopic cholecystectomy, an explosion in the application of minimally invasive techniques for general surgical procedures has developed. Much of the incentive to develop these new minimally invasive techniques have been driven by patient demand, spurred on by the lay press and the Internet. Hospitals are also touting the benefits of minimally invasive surgery as a way of attracting more patients. Included in this wave of new applications are minimally invasive techniques to repair the common inguinal hernia.

Current Laparoscopic Herniorrhaphies

The first description of a laparoscopic hernia repair was in 1989 by Ger who reported a simple ligation of the hernia sac along with closure of the fascial defect. Subsequent methods included simple mesh plugs placed in the internal ring to occlude the hernia defect or intraperitoneal onlay patches to cover the defect. These early attempts at laparoscopic repair were associated with high recurrence rates or other complications and have since been abandoned. Current laparoscopic herniorrhaphies are based on the principles of conventional open preperitoneal repairs and can be classified into two types: 1) transabdominal preperitoneal repair (TAPP) and 2) the totally extraperitoneal repair (TEP). Both techniques have their advantages and disadvantages. Common advantages to both techniques include a decrease in postoperative pain,[3] earlier return to normal activity, and improved cosmesis. However, unlike traditional open herniorrhaphy which can be performed under local anesthesia with sedation, both laparoscopic techniques have the disadvantage of requiring general or regional anesthesia. In addition, laparoscopic repairs are more expensive due to the need for disposable instruments, trocars and video equipment.[2] Lastly, many surgeons claim that neither type of laparoscopic hernia repair has been around long enough to know the risk of late recurrences.

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Transabdominal Preperitoneal Repair (TAPP)

Currently, the most popular laparoscopic technique is the TAPP repair. The procedure is performed intra-abdominally, placing a 10 mm laparoscope into the abdomen. The peritoneum just anterior to the internal ring is incised and the peritoneal surface is dissected off the abdominal wall. The pertinent anatomy is carefully exposed and a large panel of synthetic mesh is placed on the anterior abdominal wall and tacked in place to cover the hernia defects. The peritoneum is then closed over the mesh to completely cover it and separate the mesh from the intraperitoneal contents. The major advantages of the TAPP approach are that the contralateral side can easily be examined at the time of a unilateral repair and the working space is much larger, making it the easiest of the two laparoscopic repairs. The main disadvantage is that the operation is performed completely intraperitoneally, potentially exposing the intra-abdominal contents to the risks of any abdominal surgery including vascular and intestinal trocar injuries, postoperative bowel obstruction and trocar site herniation.

Totally Extraperitoneal Repair (TEP)

Although this approach is technically the most difficult, it is perhaps the most satisfying of all laparoscopic hernia repairs developed thus far. The operation is performed according to techniques that have proven effective in open surgery. No compromises in technique are made to accomplish this repair laparoscopically. The procedure is performed by first creating a totally extraperitoneal working space using a air or water filled balloon to dissect the peritoneum off the abdominal wall and create a preperitoneal space. Once this space is created, a pneumo-preperitoneum is established using CO_2 gas insufflation. From this point, the operation is performed in a similar manner to the TAPP repair. The appropriate structures are identified and again a large panel of synthetic mesh is tacked into place to completely cover and reinforce the inguinal floor. Despite being the most difficult of all laparoscopic hernia repairs because of the limitation of a small working space in the preperitoneum, this operation is gaining popularity and may become the laparoscopic repair of choice. The TEP repair offers the same advantages as the TAPP repair but because it is performed totally extraperitoneally, it minimizes the risk of intra-abdominal complications. Furthermore, much of the hernia dissection is performed by the balloon during the creation of the preperitoneal space, saving operative time and simplifying the identification of the anatomy.

Indications and Patient Selection

The first and most important criteria is that the patient be a suitable candidate for general anesthesia. Unlike open hernia repairs, laparoscopic repairs cannot be performed using local anesthesia. Although laparoscopic herniorrhaphy has been performed using regional anesthesia, most surgeons feel that additional abdominal relaxation obtained with general anesthesia is important and routinely require it for this approach. Beyond the requirement that patients be suitable medical candidates for general anesthesia, selection of patients suitable for a laparoscopic approach is a subject of controversy. The benefits of decreased postoperative pain and earlier return to activity are greatest in patients who undergo simultaneous laparoscopic repair of bilateral hernias or those who have recurrent hernias. Patients with bilateral hernias benefit because instead of the large incision in each groin necessary for open repair, both hernias can be repaired laparoscopically through the same small incisions with minimal in-

crease in postoperative pain. Furthermore, patients who have recurrent unilateral or bilateral inguinal hernias, also benefit because the laparoscopic approach avoids having to operate through scar from the previous surgery. Also, patients whose occupation or lifestyle require returning to full activity as soon as possible can also benefit from laparoscopic herniorrhaphy. Unlike open repair which leads to a 3-6 week period of disability, most surgeons allow patients to resume normal activity as soon as they feel able to. Typically, most return to normal activity within a week, although many highly motivated individuals return to strenuous physical activity in 2-3 days following surgery.

Results

Both retrospective reviews and randomized, prospective trials have demonstrated the benefit of decreased postoperative pain and earlier return to normal activity for laparoscopic repair as compared to "tension free" open hernia repair.[1,2,4] Postoperative pain has been significantly less and most studies have documented that patients are more comfortable and need less analgesia postoperatively. Patients return to work sooner, and this is especially true for those patients who must return to a physically strenuous job. The incidence of recurrence compares favorably to open hernia repairs and ranges from 0.3-5.0% for TAPP repairs and 0 - 8% for TEP repairs.[5,6] The most common reasons for recurrences have been technical problems with placement of the mesh or missing a second hernia by not completely dissecting the direct and indirect spaces. Most reports demonstrate that the incidence of recurrence decreases as surgeons gain experience with this approach. Also, not surprisingly, large hernias, bilateral hernias and complex hernias have been associated with the highest risk of recurrences and likewise, these hernias are best performed by surgeons experienced with the procedure.[7] Additional complications specific to the laparoscopic approach have been a small incidence of nerve entrapment syndromes resulting in chronic pain, trocar site hernias, and a slightly higher incidence of seromas. Lastly, the TAPP approach is associated with a 0.2% incidence of small bowel obstruction usually due to adhesions at the operative site.

Conclusions

Laparoscopic herniorrhaphy is a viable alternative to standard open inguinal hernia repair. It is associated with less postoperative pain and a quicker return to normal activity. It has recurrence rates comparable to standard open repair and can be performed with low morbidity. For patients with bilateral or recurrent inguinal hernias or those who need to return to activity quickly, laparoscopic herniorrhaphy may be the procedure of choice.

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